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II. Flow Charts

- Alignment
- Backspace
- Escapement
- Justification
- L. H. Margin
- Print
- Tab
- Dropping Characters

III. Service Hints

ALIGNMENT
(Gauge Font Alignment Check)

A. Verical - Using 1/84th pitch and stick shift position one, make a strike up similar to the master sent with the gauge font. Compare this strike up with the gauge font master. The slight variations in vertical alignment of the master (fig 1) are inherent in the gauge font and will be the only variations you should see on your strike up.

It should be taken into consideration that the sample received with the gauge font is only as good as the machine on which it was produced. Therefore, the results obtained on the customer's machine should equal or exceed this gauge font sample.

B. Horizontal - Using 1/72th pitch, stick shift position one and a leading dial setting or six, type several identical lines in upper case. The blocks should form parallel vertical lines between characters (fig 2). The printed line weight of an alignment block is approximately .005". Variations or more than 1/2 a line weight usually indicates an alignment problem (fig 3).

By typing one sample slowly and one fast (system playback if possible), alignment problems due to carrier movement (escapement, cords, pulleys, binds, etc.) can be isolated from the carrier and rocker assembly (rotate detent, print sleeve end play, etc.).

NOTE: If available, the pocket comparator is a useful aid in viewing alignment samples.

UNIT BACKSPACE

Set the LH margin at zero and the RH at 12. Tab the carrier just past the RH margin and then repeat backspace to zero. The carrier should not hesitate and the indicating tube should restore to rest. Watch the pins for .030" - .050" overthrow.

Repeat backspace a few picas at the center and right of the machine, while lightly restricting the carrier movement.

CHARACTER BACKSPACE

A. Check for intermittent failure of the character backspace.

1. Tab the carrier away from the left margin.
2. Manually set all the pins in the pinwheel.
3. Operate the character backspace. Observe the pinwheel for single operation each time the character backspace keybutton is depressed. Operate the character backspace until the pinwheel has rotated 360 degrees.

B. Check for sufficient drive
(CAUTION: This test should not be made near the LH margin.)

1. Set the LH margin on 0, the RH margin on 36; position the carrier on 30.
2. Strike two lower case "m's", unit backspacing after the second "m".
3. Strike five more "m's", unit backspacing after each one.
4. Operate the character backspace once. The carrier should backspace to the second "m". No hesitation should be seen in the carrier motion.

C. Check for extra units

1. Set the LH margin at zero.
2. Place the Pitch Selector in 1/72 pitch.
3. Return the carrier and type four upper case "M's".
4. Return the carrier and type one upper case "M".
5. Operate the character backspace twice.
6. Strike two upper case "M's". The first "M" should be nine (9) units into overbank and the second "M" should strike over the "M" at the left hand margin. Repeat several times.

CARRIER RETURN

A. Check to see if leadscrew is home before carrier return unlatches.

1. Set LH margin away from zero; Pitch Selector in 1/96th pitch.
2. Type lower case "wm" (17 units).
3. Return the carrier while blocking the homing pawl from latching.
4. Repeat this procedure several times. Watch for uneven left hand margin. (This is the same as escapement check A.)
   Observe that homing stop reached home.

B. Check for proper latching and unlatching of carrier return.

1. Set LH margin at zero.
2. Operate carrier return while holding the LH margin rack.
3. Let the carrier move slowly into overbank.
   a. Carrier return should unlatch just before carrier reaches full overbank.
   b. Pointer should indicate zero after carrier return unlatches.
4. Tab to 6, space and carrier return. Repeat several times.

CYCLE CLUTCH

Type a series of 8's while appling a light load to the print shaft.
CAUTION: Do not use your hands as the print shaft keyway has sharp edges.

Operate a spacebar and the character "s" repeatedly and check for extra cycles (@/=).

Type several characters - backing the print shaft up after each character. Check for a buzzing cycle clutch.

ESCAPEMENT

A. Free System

1. Set LH margin away from zero; Pitch Selector in 1/96th pitch; return carrier.
2. Type lower case "wm" (17 units).
3. Return the carrier while blocking the homing pawl from latching.
4. Repeat this procedure several times. Watch for uneven left hand margin and observe that the homing stop reaches home.

B. General

1. Type all characters alternately in upper and then lower case several times very fast and check for any escapement failures.
2. With the machine in the 1/72 pitch type several lines of upper case M's and W's as fast as possible and check to see that all characters near the end of the line are aligned under the ones above.

B. General (con't)

3. With the pitch selector lever in the 1/72 pitch, type several characters, then move the pitch selector lever slowly forward making sure not to overthrown the 1/84 pitch and observe that the machine did change pitches and did not skip or pile type. The only extra space between characters should occur between respective pitches. Follow the same procedure, moving the pitch selector lever to the 1/96 pitch position. Then follow the same procedure, moving the pitch selector lever in the other direction.
4. Repeat spacebar at all values while watching the set pins for correct and constant values. (If failures occur, check spacebar first.)

(NOTE: ALIGNMENT FAILURES CAN OFTEN LOOK LIKE ESCAPEMENT FAILURES!)

INDEXING

A. Mark one tooth on each index ratchet with a grease pencil and run the complete indexing check using a fast erratic carrier return operation rather than index.

INDEXING CHECK

RATCHET REVOLUTIONS

MODE	LH	RH
5	1	1
6	1	2
7	1	3
8	1	4
9	2	1
10	2	2
11	2	3
12	2	4
13	3	1
14	3	2
15	3	3
16	3	4
17	4	1
18	4	2
19	4	3
20	4	4

B. With a sheet of paper in the machine, start with the leading dial on five and operate carrier return several times printing a character after every operation. Advance the leading dial after every group of operations and after all values have been operated; check closely for any indexing failures.

INTERLOCKS

A. Carrier return to print

1. Set LH margin to zero; tab carrier to right end of writing line. Return carrier and strike a character while carrier is returning. The character should not print until carrier settles at LH margin.
2. Hold the spacebar in repeat and return the carrier. No spacebar operation should occur during return, but the spacebar operation should resume when carrier return unlatches.
3. Depress carrier return button into repeat; strike a character. The character should not print until carrier return keybutton is released.

B. Shift to print

1. Strike each character in upper and lower case alternately. Watch for keyboard lock-up or a delay in cycle clutch release.

C. Unit backspace to print

1. Depress unit backspace into repeat; strike a character. The character should not print until the unit backspace button is released.

D. Print to unit backspace

1. Hold spacebar into repeat; depress unit backspace button into repeat. The backspace operation should interrupt the spacebar operation.

E. Character backspace to print
(CAUTION: Carrier should be away from LH margin for this test.)

1. Strike two lower case "m's"; backspace one unit. Strike five more "m's", backspace one unit after each one. This clears all pins but one.
2. Depress the character backspace button.
3. Strike lower case "m" while the carrier is backspacing. This "m" should strike over the second "m".

F. Backspace in overbank

1. Place pitch selector in 1/96 pitch.
2. Return the carrier.
3. Unit backspace twice. The character backspace should not operate.
4. Continue to backspace. The unit backspace should be completely interlocked sometime before you are 9 units into overbank.

A. J-Tube indexing

1. With the LH margin at zero and the pitch selector lever in 1/72 pitch; engage J-lever.
2. Operate spacebar once and return the carrier. Watch the J-tube for a single index.
3. Operate spacebar three times and return the carrier while watching the counter for proper indexing. Repeat several times.
4. Return the carrier and repeat spacebar until the pointer reaches:
   2 - Counter should read 8
   4 - Counter should read 16
   4 3/4 - Counter should read 19
5. Hold the justifier tube and operate the carrier return. Allow the justifier tube to slowly return from 19 to zero.

B. Step-Down

1. Rotate quantity dial in both directions to check for binds.
2. Rotate value dial from 3 to 9 several times to check for binds.
3. Engage justification lever. A positive detent should be felt, as the lever is fully engaged. Slowly move the value dial from 3 to 4. The J-lever must snap back to rest.
4. Engage J-lever again. Value dial should move to 3.
5. Repeat the above, moving the value dial to a higher setting each time (5,6,7,8 and 9).
6. Set the LH margin on zero; pitch selector on 1/72 pitch, quantity dial on 20, and value dial on 3.
7. Return the carrier and repeat spacebar; when pointer reaches:
   2 - Quantity dial should read 12
   4 - Quantity dial should read 4
   4 3/4 - Quantity dial should read 1
8. Quantity dial on 20 and value dial on 4; strike alternate spacebar and character until quantity dial reaches zero and value dial steps to 3. Quantity dial must step down and detent after each spacebar operation, but no dial movement should be seen during the character print cycle.

   NOTE: Operate spacebar, character, spacebar, character, in both the read and write modes to observe that the counting operations do not count characters.

C. Indicator Tube returning to LH margin

1. Set tab stop at 40 and RH margin at 39.
2. Tab carrier to 40.
3. Carrier return while holding the indicator tube. Slowly allow the tube to return to the left.
4. Repeat step 3 with the margin on 74 and a tab stop at 75; margin at 12 and a tab stop at 13.

D. Tube Indication - Spacbar

1. Set RH margin at 12; tab stop at 9; spacebar value dial at 4 and the pitch selector at 1/96.
2. Tab to 9; the white line should be on 48 in the 1/96 pitch window with the vernier adjustment approximately centered.
3. Space once and the white line should be on 44.
4. Unit backspace and ensure that the window graduations stay in alignment with the white line.

With the machine in the 1/72 pitch, perform the following exercise.

JUSTIFICATION EXERCISE

LH Margin 0 — RH Margin 12	Tab Stop 15	Justification Data	Number of Spacebars
1234567890123456	1234567890123456	(Blue - 3)	15 Spacebars
123456789012345	1 2 3 4 5 6 7 8 9 0 1 2 3 4 5	(Blue - 12)	14 Spacebars
12345678901234	1 2 3 4 5 6 7 8 9 0 1 2 3 4	(Orange - 8)	13 Spacebars
1234567890123	1 2 3 4 5 6 7 8 9 0 1 2 3	(Green - 6)	12 Spacebars
123456789012	1 2 3 4 5 6 7 8 9 0 1 2	(White -6)	11 Spacebars
12345678901	1 2 3 4 5 6 7 8 9 0 1	(Red - 8)	10 Spacebars
1234566778899	1 2 3 4 5 66 77 88 99	(Yellow - 2)	8 Spacebars

NOTE: The tube should be manually relaeased if it fails to trip on the sixth line in the above exercise.

KEYBOARD

Type each character three times and observe that no character fails to print and no keylever is hard to depress.

Let several characters on each side of the keyboard restore slowly and observe a restoring clearance.

With the machine running, pull up on the restoring roller and release a character and ease the roller down and make sure the character is tripped off. Try this check on each end and on each side of center of the keyboard.

PAPER FEED

A. Skew

1. Machine settings
   Leading: 20 point
   Font: UN-11-B or largest typestyle available
   Impression: Stick 1 for the M-Dash (UC)
   Stick 5 for the "Z" (UC)
2. Type 20 lines of "Dashes"

PAPER FEED

A. Skew (con't)

3. Roll the paper back until the first line of dashes aligns with the horizontal scribe line on the card holder and type one Z at each end of line.
4. Type full rows of upper case Z's on the succeeding lines.

NOTE: The two Z's on the first line should be an equal distance from the dashes. If they are not, paper feed adjustments should be checked. Any change in the parallel condition between any succeeding lines of Z's and dashes will indicate a problem caused by font impact and requires installing the redesigned feed rolls.

B. Line to Line variation

1. Using a 1/72 pitch font, type several upper case dashes in 1/84th pitch.
2. With the leading dial set at 20, return the carrier and repeat step 1 for approximately 2 platen revolutions.
3. Remove the paper and cut a straight line down the center of dashes just typed.
4. Now mis-match the two pieces of paper; i.e. line up the first line of dashes on one piece of paper with the 8th line of dashes on the other.
5. At no point should the dashes mis-match by more than .014" of an inch (approximately 1 point).

PRINT and RIBBON

A. Print

1. Type many periods, commas and colons and observe that the ribbon doesn't fail to feed while typing low velocity characters.
2. Type several periods, l's, and m's and listen for the sound of the three different velocities.
3. Operate the repeat spacebar and observe that the ribbon doesn't feed.
4. Latch the No-Print key down, type several characters, and observe that the ribbon doesn't feed.

A. Print (con't)

5. Type many upper case M's and W's using a UN-11-B type font and check for even top and botton, and side to side. (Use impression position 1.)
6. Type a series of upper case M's and W's and check for proper placement on the ribbon and a minimum of voids on the paper. (Use impression position 6.) Check the DKD for no escapement at positions 38 and 41.
7. Type each character several times using customer's smallest type size. Check for embossing.

SHIFT

Hold the shift cam detent arm released and depress a character, then shift. Observe that the character is stored.

Allow the detent arm to slowly return to rest, ensuring that it properly seats in the shift cam notch and that the character in storage is reliably released.

Repeat steps 1 and 2 several times in each case.

With the On/Off switch off -depress each character keybutton while manually shifting the escapement bails. Any interference between the escapement code bails and the interposers can be felt at the keybutton.

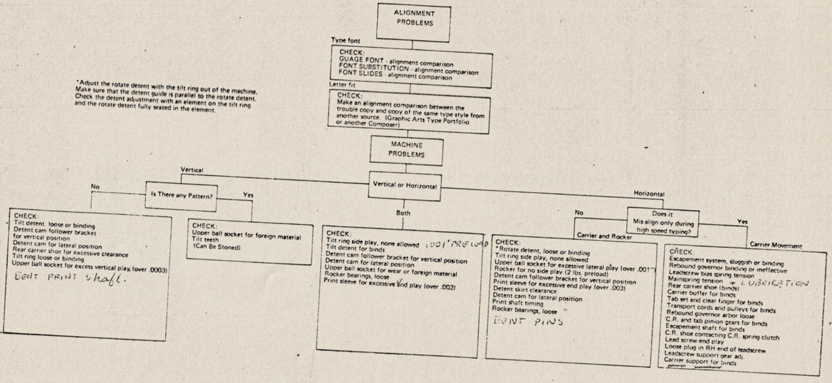
TAB

A. "Short" and "Long" Tab

1. Set eight or ten tab stops at random across the writing line.
2. Place the pitch selector in 1/72 pitch.
3. Depress the Tab Locate button.
4. Type the lower case characters "ce" at the LH margin. A single tab operation should move the carrier to the next tab stop (2 units away). Continue to type "ce" and tab alternately. The carrier should stop at every tab stop, set or cleared.
5. Type "de" at the LH margin. A single tab should now move the carrier to the second tab stop. Continue to type "de" and tab alternately. The carrier should stop at every other stop.
6. Restore tab locate button. Operate tab and print 1 in each column across the page at least ten lines in each pitch and observe all columns are aligned correctly.
7. With the RH margin set at position 12, set a tab stop at position 10 and tab to it and then away from it, making sure the tab does not fail to operate at this position.
8. Carrier return, unit backspace to limit and operate tab, ensure the carrier reaches a set tab stop.
9. Operate carrier return and then tab to check the catch tab operation.

B. Check Tab Brake and Cord Tightener

1. Return the carrier and operate spacebar once.
2. Hold the bias rewind gear and operate the tab. There should be less than 1/32 motion to the right by the carrier. Release the gear and the carrier should tab.
3. Repeat this test to check both lobes of the cam.
Gang clear all tabs.


ALIGNMENT PROBLEMS
Type font
Letter fit
MACHINE PROBLEMS
Vertical or Horizontal
Vertical
Is There any Pattern?
No
Yes
Both
Horizontal
Does it Mis-align only during high speed typing?
No
Carrier and Rocker
Yes
Carrier Movement

CHECK:
GUAGE FONT - alignment comparison
FONT SUBSTITUTION - alignment comparison
FONT SLIDES - alignment comparison

CHECK:
Make an alignment comparison between the trouble copy and copy of the same type style from another source. (Graphic Arts Type Portfolio or another Composer)

CHECK:
Tilt detent loose or binding
Detent cam follower bracket for vertical position
Detent cam for lateral position
Rear carrier shoe for excessive clearance
Tilt ring loose or binding
Upper ball socket for excess vertical play (over .0003)
BENT PRINT shaft.

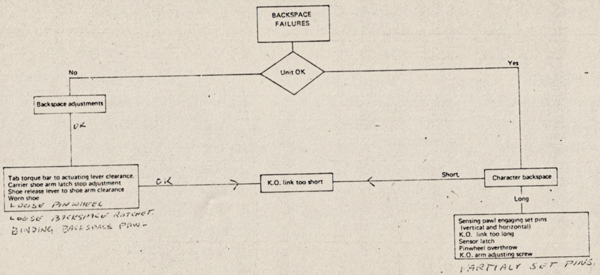
CHECK:
Upper ball socket for foreign material
Tilt teeth
(Can Be Stoned)

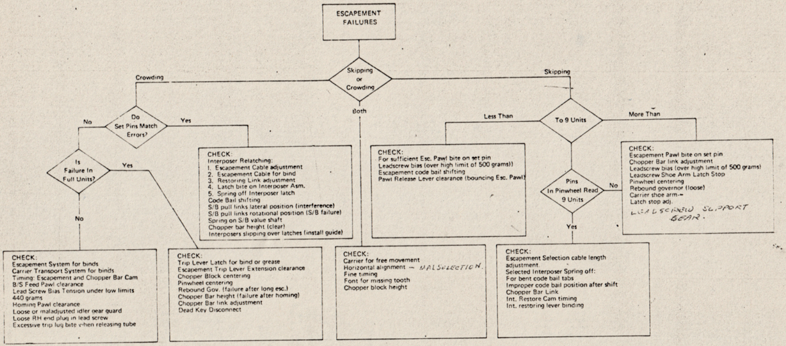
CHECK:
Tilt ring side play, none allowed .001" PRELOAD
Tilt detent for binds
Detent cam follower bracket for vertical position
Detent cam for lateral position
Upper ball socket for wear or foreign material
Rocker bearings, loose
Print sleeve for excessive end play (over .003)

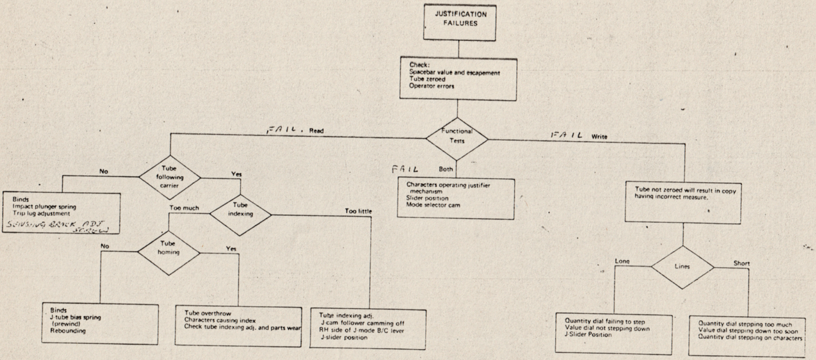
CHECK:
*Rotate detent, loose or binding
Tilt ring side play, none allowed
Upper ball socket for excessive lateral play (over .001")
Rocker for no side play (2 lbs. preload)
Detent cam follower bracket for vertical position
Print sleeve for excessive end play (over .003)
Detent skirt clearance
Detent cam for lateral position
Print shaft timing
Rocker bearings, loose
BENT PINS

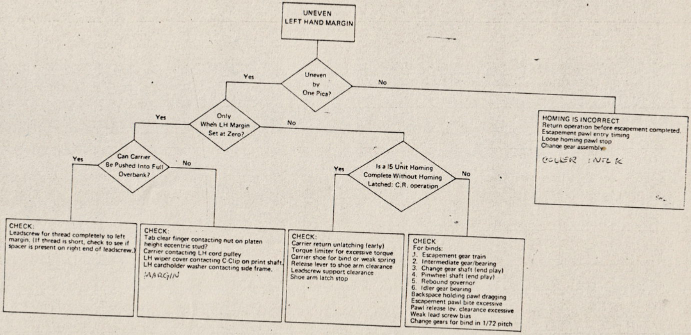
CHECK:
Escapement system, sluggish or binding
Rebound governor binding or ineffective
Leadscrew bias spring tension
Mainspring tension + LUBRICATION
Rear carrier shoe (binds)
Carrier buffer for binds
Tab set and clear finger for binds
Transport cords and pulleys for binds
Rebound governor arbor loose
C.R. and tab pinion gears for binds
Escapement shaft for binds
C.R. shoe contacting C.R. spring clutch
Lead screw end play
Loose plug in RH end of leadscrew
Leadscrew support gear adj.
Carrier support for binds

*Adjust the rotate detent with the tilt ring out of the machine. Make sure that the detent guide is parallel to the rotate detent. Check the detent adjustment with an element on the tilt ring and the rotate detent fully seated in the element.


BACKSPACE FAILURES
Unit OK
No
Yes
Backspace adjustments
OK
Tab torque bar to actuating lever clearance.
Carrier shoe arm latch stop adjustment
Shoe release lever to shoe arm clearance
Worn shoe
LOOSE PINWHEEL
LOOSE BACKSPACE RATCHET.
BINDING BACKSPACE PAW-
OK
K.O. link too short
Short,
Character backspace
Long
Sensing pawl engaging set pins
(vertical and horizontal)
K.O. link too long
Sensor latch
Pinwheel overthrow
K.O. arm adjusting screw
PARTIALY SET PINS,


ESCAPEMENT FAILURES
Skipping or Crowding
Crowding
Both
Skipping
Do Set Pins Match Errors?
No
Yes
Is Failure In Full Units?
Yes
No
To 9 Units
Less Than
More Than
Pins In Pinwheel Read 9 Units
No
Yes
CHECK:
Escapement System for binds
Carrier Transport System for binds
Timing: Escapement and Chopper Bar Cam
B/S Feed Pawl clearance
Lead Screw Bias Tension under low limits 440 grams
Homing Pawl clearance
Loose or maladjusted idler gear guard
Loose RH end plug in lead screw
Excessive trip lug bite when releasing tube
CHECK:
Trip Lever Latch for bind or grease
Escapement Trip Lever Extension clearance
Chopper Block centering
Pinwheel centering
Rebound Gov. (failure after long esc.)
Chopper Bar height (failure after homing)
Chopper Bar link adjustment
Dead Key Disconnect
CHECK:
Interposer Relatching:
1. Escapement Cable adjustment
2. Escapement Cable for bind
3. Restoring Link adjustment
4. Latch bite on Interposer Asm.
5. Spring off Interposer latch
Code Bail shifting
S/B pull links lateral position (interference)
S/B pull links rotational position (S/B failure)
Spring on S/B value shaft
Chopper bar height (clear)
Interposers slipping over latches (install guide)
CHECK:
Carrier for free movement
Horizontal alignment — MALSELECTION.
Fine timing
Font for missing tooth
Chopper block height
CHECK:
For sufficient Esc. Pawl bite on set pin
Leadscrew bias (over high limit of 500 grams))
Escapement code bail shifting
Pawl Release Lever clearance (bouncing Esc. Pawl)
CHECK:
Escapement Selection cable length adjustment.
Selected Interposer Spring off:
For bent code bail tabs
Improper code bail position after shift
Chopper Bar Link
Int. Restore Cam timing
Int. restoring lever binding
CHECK:
Escapement Pawl bite on set pin
Chopper Bar link adjustment
Leadscrew bias (over high limit of 500 grams)
Leadscrew Shoe Arm Latch Stop
Pinwheel centering
Rebound governor (loose)
Carrier shoe arm.–
Latch stop adj.
LEADSCREW SUPPORT GEAR.


JUSTIFICATION FAILURES
Check:
Spacebar value and escapement
Tube zeroed
Operator errors
Functional Tests
FAIL. Read
FAIL Write
FAIL Both
Tube following carrier
No
Yes
Binds
Impact plunger spring
Trip lug adjustment
SENSING BRACK ADJ SCREW
Tube indexing
Too much
Too little
Tube homing
No
Yes
Binds
J-tube bias spring (prewind)
Rebounding
Tube overthrow
Characters causing index
Check tube indexing adj. and parts wear
Tube indexing adj.
J-cam follower camming off
RH side of J-mode B/C lever
J-slider position
Characters operating justifier mechanism
Slider position
Mode selector cam
Tube not zeroed will result in copy having incorrect measure.
Lines
Long
Short
Quantity dial failing to step
Value dial not stepping down
J-Slider Position
Quantity dial stepping too much
Value dial stepping down too soon
Quantity dial stepping on characters



UNEVEN LEFT HAND MARGIN
Uneven by One Pica?
Yes
No
Only When LH Margin Set at Zero?
Yes
No
Can Carrier Be Pushed Into Full Overbank?
Yes
No
Is a 15 Unit Homing Complete Without Homing Latched: C.R. operation
Yes
No

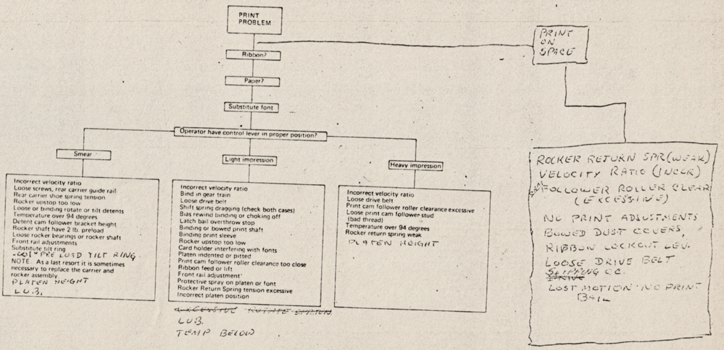
CHECK:
Leadscrew for thread completely to left margin. (If thread is short, check to see if spacer is present on right end of leadscrew.)

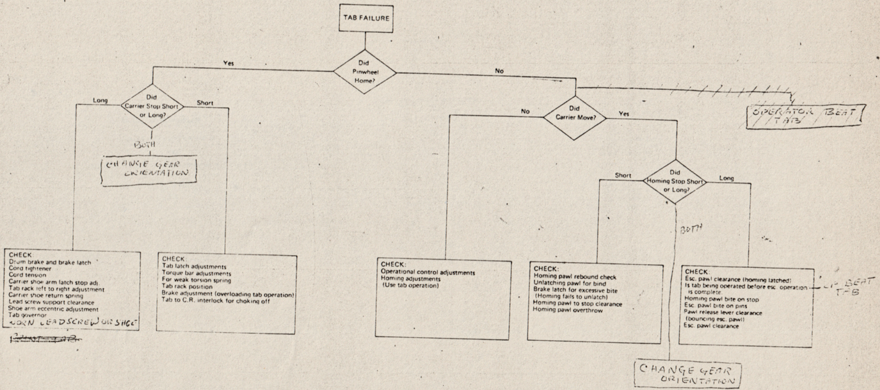
CHECK:
Tab clear finger contacting nut on platen height eccentric stud?
Carrier contacting LH cord pulley
LH wiper cover contacting C-Clip on print shaft.
LH cardholder washer contacting side frame.
MARGIN

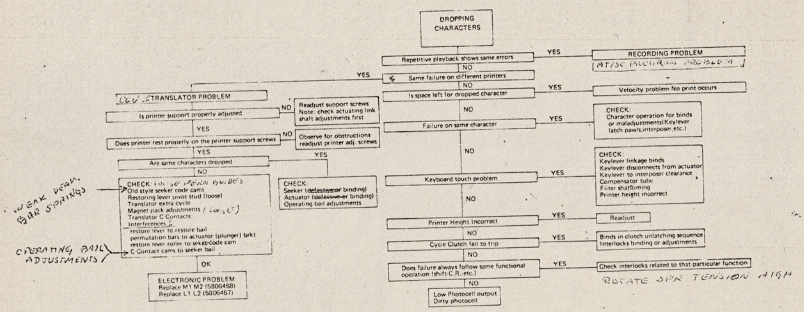
CHECK:
Carrier return unlatching (early)
Torque limiter for excessive torque
Carrier shoe for bind or weak spring
Release lever to shoe arm clearance
Leadscrew support clearance
Shoe arm latch stop

CHECK
For binds:
1. Escapement gear train
2. Intermediate gear/bearing
3. Change gear shaft (end play)
4. Pinwheel shaft (end play)
5. Rebound governor
6. Idler gear bearing
Backspace holding pawl dragging
Escapement pawl bite excessive
Pawl release lev. clearance excessive
Weak lead screw bias
Change gears for bind in 1/72 pitch

HOMING IS INCORRECT
Return operation before escapement completed.
Escapement pawl entry timing
Loose homing pawl stop
Change gear assembly
COVER INTLK


PRINT PROBLEM
Ribbon?
Paper?
Substitute font
Operator have control lever in proper position?
Smear
Incorrect velocity ratio
Loose screws, rear carrier guide rail
Rear carrier shoe spring tension
Rocker upstop too low
Loose or binding rotate or tilt detents
Temperature over 94 degrees
Detent cam follower bracket height
Rocker shaft have 2 lb. preload
Loose rocker bearings or rocker shaft
Front rail adjustments
Substitute tilt ring
[illegible] PRE LOAD TILT RING
NOTE: As a last resort it is sometimes necessary to replace the carrier and rocker assembly.
PLATEN HEIGHT
LUB.
Light impression
Incorrect velocity ratio
Bind in gear train
Loose drive belt
Shift spring dragging (check both cases)
Bias rewind binding or choking off
Latch bail overthrow stop
Binding or bowed print shaft
Binding print sleeve
Rocker upstop too low
Card holder interfering with fonts
Platen indented or pitted
Print cam follower roller clearance too close
Ribbon feed or lift
Front rail adjustment
Protective spray on platen or font
Rocker Return Spring tension excessive
Incorrect platen position
~~EXCESSIVE ROTATE SPRING~~
LUB.
TEMP BELOW
Heavy impression
Incorrect velocity ratio
Loose drive belt
Print cam follower roller clearance excessive
Loose print cam follower stud (bad thread)
Temperature over 94 degrees
Rocker return spring weak
PLATEN HEIGHT
PRINT ON SPACE
ROCKER RETURN SPR (WEAR)
VELOCITY RATIO (INCOR)
FOLLOWER ROLLER CLEAR (EXCESSIVE)
NO PRINT ADJUSTMENTS
BOWED DUST COVERS,
RIBBON LOCKOUT LEV.
LOOSE DRIVE BELT
SLIPPING CC.
~~DRIVE~~
LOST MOTION NO PRINT BAIL


TAB FAILURE
Did Pinwheel Home?
Yes
No
Did Carrier Stop Short or Long?
Long
Short
BOTH
CHANGE GEAR ORIENTATION
CHECK:
Drum brake and brake latch
Cord tightener
Cord tension
Carrier shoe arm latch stop adj.
Tab rack left to right adjustment
Carrier shoe return spring
Lead screw support clearance
Shoe arm eccentric adjustment
Tab governor
WORN LEADSCREW OR SHOE
CHECK:
Tab latch adjustments
Torque bar adjustments
For weak torsion spring
Tab rack position
Brake adjustment (overloading tab operation)
Tab to C.R. interlock for choking off
OPERATOR BEAT TAB
Did Carrier Move?
No
Yes
CHECK:
Operational control adjustments
Homing adjustments
(Use tab operation)
Did Homing Stop Short or Long?
Short
Long
BOTH
CHECK:
Homing pawl rebound check
Unlatching pawl for bind
Brake latch for excessive bite
(Homing fails to unlatch)
Homing pawl to stop clearance
Homing pawl overthrow
CHECK:
Esc. pawl clearance (homing latched)
Is tab being operated before esc. operation is complete.
Homing pawl bite on stop
Esc. pawl bite on pins
Pawl release lever clearance
(bouncing esc. pawl)
Esc. pawl clearance
OP BEAT TAB
CHANGE GEAR ORIENTATION


DROPPING CHARACTERS
Repetitive playback shows same errors
YES
RECORDING PROBLEM
MT/SC PROGRAM PROBLEM
NO
* Same failure on different printers
YES
TRANSLATOR PROBLEM
Is printer support properly adjusted
NO
Readjust support screws Note: check actuating link shaft adjustments first
YES
Does printer rest properly on the printer support screws
NO
Observe for obstructions readjust printer adj. screws
YES
Are same characters dropped
YES
CHECK: Seeker (~~defective or~~ binding) Actuator (~~defective or~~ binding) Operating bail adjustments
NO
CHECK: LOOSE PERM GUIDES
Old style seeker code cams
Restoring lever pivot stud (loose)
Translator extra cycle
Magnet pack adjustments
Translator C Contacts
Interferences
restore lever to restore bail
permutation bars to actuator (plunger) brkt
restore lever roller to seeker code cam
C Contact cams to seeker bail
WEAK PERM. BAR SPRINGS
OPERATING BAIL ADJUSTMENTS
OK
ELECTRONIC PROBLEM Replace M1 M2 (5806468) Replace L1 L2 (5806467)
NO
Is space left for dropped character
YES
Velocity problem No print occurs
NO
Failure on same character
YES
CHECK: Character operation for binds or maladjustments(Keylever latch pawls,interposer,etc.)
NO
Keyboard touch problem
YES
CHECK: Keylever linkage binds Keylever disconnects from actuator Keylever to interposer clearance Compensator tube Filter shaftiming Printer height incorrect
NO
Printer Height Incorrect
YES
Readjust
NO
Cycle Clutch fail to trip
YES
Binds in clutch unlatching sequence Interlocks binding or adjustments
NO
Does failure always follow same functional operation (shift-C.R.-etc.)
YES
Check interlocks related to that particular function
ROTATE SPR TENSION HIGH
NO
Low Photocell output Dirty photocell

* SAME FAILURE CAN OCCUR ON DIFF. PRINTERS

SERVICE HINTS

A. Alignment

Fonts - Date of Manufacture: To more effectively use font substitution as an aid in diagnosing alignment problems, it is helpful to substitute fonts of a different manufacturing date. The month and year of manufacture of a font can be determined by a dot system.

The dots are located between the ribs on the inside of the font. Each dot represents a month of the year; therefore, one to twelve dots, representing January through December, may be found in a section.

Fonts manufactured in 1967 will have dots in only one section. Fonts manufactured in 1968 will have dots in two sections. The date of manufacture can then be determined by counting the section with the least number of dots.

June 1967 Manufactured
(6 Dots in One Section)

March 1968 Manufactured
(12 Dots in One Section,
3 Dots in Other Section)

NOTE: The alphabetic character found inside the font represents the mold on which the font was manufactured and has no bearing on the date of manufacture. Fonts may also vary from mold to mold. Fonts manufactured prior to May of 1967 are not date coded.

Fonts Slides - The "Selectric" Composer font is composed of eleven "slides" (Fig. 1), each containing two rotate bands. An alignment problem may be caused by a "slide" being slightly out of position during manufacturing. To isolate this condition, type different character combinations and compare characters from other slides with the characters from the slide suspected of mis-alignment.

A. Alignment (con't)

Graphic Arts Type Portfolio (Form No. 549-0201) - This is a sales manual containing actual samples of the Composer type styles. Comparisons can be made between the type sample found in this book and that produced on the customer's machine. The results obtained on the customer's machine should equal or exceed the alignment found in this book.

Pocket Comparator - The pocket comparator (Tool No. 9900463), used with the MT/ST and MT/SC, has a ten power lens and can be used effectively as a viewing glass for alignment and print problems. The line weight or thickness of each of the three lines is .001". The distance between line 1 and line 2 is .006" and the distance between line 2 and line 3 is .007". With the use of these lines as reference points, variations in vertical or horizontal alignment can easily be seen or even measured.

B. Backspace

Replacing "Nylock" Screw - The locking ability of the "Nylock" screw may be lost for the portion of the screw that has previously been turned into threads of the K/O arm. Therefore, it is recommended that this screw be replaced anytime that an adjustment requires that the screw be backed out from its original position.

Overbank Failure - There have been reports that the character backspace keylever pawl overthrows past the unit backspace keylever pawl as a result of the overbank interlock function. This failure can be eliminated by forming the contact lug on the unit backspace keylever pawl in an upward direction.

CAUTION: Support the unit backspace keylever pawl with a T-bender while forming the lug with a pair of duckbill pliers.

C. Carrier Return

CR Release Arm Adjustment - Engagement of the CR release arm with the CR cam should not be obtained by positioning the CR cam on the operational shaft. The CR release arm (Ref 106) is formable to obtain the needed engagement with the cam.

Operational Cam Extra Cycling - Extra cycling of the C/R or B/S cam may be caused by excessive side play in the clutch release arm. A bowed C-Clip (Ref 174) may be used on the right hand end of the cam follower shafts (Ref 109) which in turn will reduce the side play or the clutch release arm (Ref 106).

NOTE: Machines above S/N 5015200 have the new style clips.

Rotate Tape Interference - Interference between the rotate tape and the transport cord on the left side of the machine can be eliminated by using a shim (PN 1090970) to raise the LH front transport pulley.

D. Cycle Clutch & Keyboard

Extra Cycle - When checking cycle clutch latch restoring (Page 3-3, Adj. 10) in Adjustment Manual, hand cycle a spacebar or an "s". The spacebar or the "s" offer the least load to the cycle shaft. This results in the cycle shaft flexing downward and decreasing the .020"-.030" overthrow of the cycle clutch control lever past the control latch.

Keyboard Lock-Up - Excessive rotate spring tension may cause keyboard lock-up due to improper shift cam detenting. Shift clutch spring adjustments may be difficult to make properly with excessive spring tension.

Malselection - An interference may exist between the -5 Bail C-Clips and link on machines below serial 5016800. Use of thinner C-Clips, P/N 1172146 will correct this.

Hand Cycling - When hand cycling to check head alignment, the selected latches are able to fall back under the latch bail before the half cycled position is reached. The following procedure will avoid this problem:

1. Make the desired selection on the keyboard.
2. Push any other selection and hold this keybutton down.
3. Hand cycle to the half cycle position.

The load on the second keybutton will, via the compensator-balls, keep the wanted interposer from falling back too early.

E. Escapement

Escapement System Binds - The following is one procedure which may be used to check the escapement system for binds.

1. With power on, gang clear all set tabs.
2. Hold carrier by hand and operate tab. After homing is complete, turn machine off. Carrier will stay where it is with leadscrew shoe latched out of leadscrew.
3. Manually operate escapement trip lever and clear all set pins in the pinwheel. Allow pinwheel to rotate slowly until leadscrew bias has run down. Leave escapement trip lever latched.
4. Remove left-hand leadscrew gear and rebound governor.
5. Escapement system may now be spun or rotated to check for binds. Turn leadscrew slowly to check for gear binds. Spin and observe coasting time to check for bearing binds.

Using Fulcrum Wire to Locate Adjustment on Chopper Block Assembly
If the end of the Model B keylever fulcrum wire (P/N 1000502) is ground off, it may be used to locate the fixtured adjustment of the chopper block assembly in the pinwheel bracket when installing one that has been removed.

Chopper Bar Height - The low chopper bar may be raised slightly by positioning the chopper bar support to hold the pivot pin vertical. The binding screw may be reached with a screwdriver by removing the platen from the machine and the pivot pin may be held vertical with a spring hook while tightening the binding screw.

Intermittent Escapement Failures - An intermittent escapement failure in 1/72 pitch may be caused by interference between the pitch selector lever and the center cover assembly. Raising the machine in the covers should produce the necessary clearance for reliable detenting of the pitch selector lever.

An intermittent escapement or homing failure may be caused by a loose end plug in the RH end of the leadscrew.

An escapement failure may result if the leadscrew bias spring tension drops below 440 grams or goes over 500 grams.

Leadscrew Bias Rewind Linkage - With the old level rewind drive crank and the new level long rewind link there would be insufficient winding motion delivered to the bias mechanism and escapement failures could result. With the new level rewind drive crank and the old level long rewind link there would be too much winding motion produced which could cause a choke-off and a buzzing.

E. Escapement (con't)

Escapement Failure - An escapement failure can be caused by failure to return the lockout link clevis (920-125) to its proper hole in the on/off switch lever. If the lockout link clevis is left in the large hole, or upper small-diameter hole, interference between the link and pull links may cause escapement failures.

Chopper Bar Block Shim (.005") - This shim now has two large holes which permit using the large fulcrum rod for repositioning the chopper bar block front-to-rear. The lateral position should be checked carefully as the pinwheel position may have changed from the original position.

Pawl Plate Mounting Bracket Shimming - In some instances, difficulty may be encountered when adjusting transfer gear/change gear backlash. If proper gear mesh is not attainable by adjusting the jack screw/idler gear mounting bracket, the pawl plate may be shimmed vertically so that proper gear mesh can be attained. The screws that mount the pawl plate are accessible from the underside of the machine. Since the pawl plate mounting bracket is pinned, its position will not be changed. Snap in cycle clutch shims (Mech 723, Ref 419) available for the "Selectric" Typewriter can be used so the screws need not be completely removed.

Cracked Rewind Bias Driving Arbor - Escapement failures may be caused by the failure of the rewind bias mechanism to rewind. This can be caused by the driving arbor being loose on its shaft (Ref 8).

Escapement Failure After Shift Down -
Problem: 1
Escapement code bail tabs striking selector lugs on the interposers when an interposer is latched down in storage during a shift down operation.

Solution - With switch off and the machine in lower case, depress and hold down the keybutton for the character giving the escapement failure. Manually push the escapement code bails into their upper case position. Allow them to restore to the lower case position slowly. Any interference between the coded tab on the escapement code bail and selector lug on the interposer can be felt through the keybutton. Form the coded tab causing the interference for .001" to .005" clearance with the interposer selector lug. The coded tabs may easily be formed by holding the escapement code bail with pliers or scissor clamp and using the pusher end of a large spring hook (Fig 1).

E. Escapement (con't)

Problem: 2
Escapement code bails failing to be in the correct position when the shift interlock releases the character in storage. (This problem would be more noticeable on a modified Composer used on a system because a character is usually stored and waiting for the shift down operation to complete.)

Solution - Check for proper braking action of the shift cam to prevent the cam from shifting down so fast that it releases the shift interlock before the escapement code bails have settled in their lower case position. The rotate spring tension, if excessive, will accelerate the shift down operation. Adjust the upper case and lower case positions of the escapement code bails so that the tabs on the escapement code bails are off-centered in relation to the selector lugs on the interposers, favoring the right side of the machine (Fig 1).

Escapement Failure - Interference between the Idler Gear Guard, (Ref 177) and Idler Gear Set Screw will cause Escapement failures. Since the Idler Gear Guard is easily moved when working on the machine, its location should be checked before installing the covers.

F. Index

Indexing Without the Platen Installed - Damage to the index pawl guide lugs can result from indexing when the platen is removed. Also, the index operation will repeat due to the choke-off of the pawls.

Index Ratchet Bearing - Improper assembly of the index ratchet bearing can cause incorrect leading. When the bearing is inserted in the four-point ratchet from the left, a bind will result between the one and four point ratchets.

F. Index (con't)

Line-to-Line Variation - A line-to-line variation during indexing that is not caused by an indexing failure may be caused by wobble from side to side of the 4-point platen ratchet. The position of this ratchet should not be controlled by the driver, but rather by the RH platen bushing (Ref 122). If, when the RH platen shaft nut is tightened, the position of the LH index ratchet is not controlled by the RH platen bushing, the bushing should be shimmed outward by placing the necessary number of shims (P/N 1091517) between the LH end of the bushing and the RH platen end plug.

G. Justification

Justifier Indicator Tube Support Ring - The right hand indicator tube guide ring (Ref 23) can be removed without completely removing the spacebar counter decal and losing its position. The decal should be loosened to the numeral one position and folded (without creasing) 90° to the right. The ring can now be removed/replaced over the decal and the decal restored to its original position.

Repositioning the Indicator Tube - The following procedure can be used to regain the relationship between the right hand margin and the indicator tube. This method works in a majority of the cases encountered in the Field, but will not work if the relationship has slipped only a few teeth. This procedure is not intended to eliminate a call but should be useful to salesmen and customers in getting the machine running again until the CE arrives.

1. Set the left hand margin to zero.
2. Tab to the end of the writing line.
3. Return the carrier to the left hand margin.
4. Reset the right hand margin as far to the left as possible (position 12).
5. Push the indicator tube slowly to the left until it snaps into position.

Impact Plunger Spring - Incorrect adjustment of the impact plunger spring could result in inconsistent data readings for the same carrier position in the justification zone or a spongy indicator tube in the justification zone. To check this spring move the carrier out of the justification zone, push the sensing bracket to the right, slowly release this bracket and observe that the sensing bracket does not move to the left after the impact plunger (Ref 77) contacts the mounting stud.

G. Justification (con't)

Justification Exercise - When performing the Justification Exercise on some machines, the indicator tube may fail to trip on the sixth line of the exercise (Red 8). This DOES NOT INDICATE A MACHINE MALFUNCTION but is only a limitation of the exercise. This line of the exercise requires that the indicating rack pawl be tripped when the carrier is 48 units from the RH margin. On some machines, because of parts tolerances and adjustments, the indicating rack pawl does not trip until the carrier is somewhere between the 47th and 48th unit. If you encounter this problem, don't attempt to readjust the machine. Instead, manually trip the indicating rack pawl on this particular line to check the tube "read" operation.

Justifier Indexing Failures - Due to the higher load when indexing the old style justifier indexing mechanism, it is possible for the J-Cam follower (Ref 40) to cam off the right side of the J-Mode bellcrank (Ref 1), causing an index failure. If this happens a nut (P/N 37913) can be added to the upper stepdown mounting bracket screw (Ref 70) to prevent the J-Cam follower from camming to the right.

J-Tube Spring Bias - The following procedure may be used to place the three-turn prewind on the J-Tube bias spring:

1. Advance the J-Tube to its maximum rotational position (20 in S/B counter window).
2. Remove the C-Clip (Ref 049) which holds the holding pawl, rebound check pawl and homing pawl.
3. Slide the homing pawl slightly to the right until it clears the indexing ratchet.
4. Rotate the J-Tube top-to-the-rear three complete turns for proper rewind.
5. Place homing pawl back into engagement with the indexing ratchet.
6. Replace C-Clip.

This procedure is easier to use than turning the bias spring cage due to the interference with the decelerator mechanism. No adjustments are disturbed.

Loose Centering Scale - A centering scale that is loose and shifts during tabulation or CR may be tightened by relocating the centering scale spring (Ref 101) between the centering scale and the handle.

G. Justification (con't)

Right-Hand Margin - It is possible for the operator to move the RH margin against the LH margin slider and leave the RH margin slider pin on top of a rack tooth, or even push the LH margin rack into the overbank region, causing the interlocks to operate and cripple backspace, character backspace and carrier return.

With the RH margin bracket moved against the LH margin stop, the stop lug on the RH margin bracket may be formed to the right or left to prevent the slider pin from remaining on top of a margin rack tooth. Be certain that the LH margin rack is out of overbank when checking this adjustment. This lug is hardened, but may be formed in one direction without losing too much strength to maintain the adjustment. If it is overformed and must be reformed in the other direction, most of the strength is lost.

Broken RH Stop Ring - Absence of the indicator tube bumper (Ref 123) may result in the right-hand stop ring being broken due to high impact on the ring when the carrier is tabbed through the justification zone. There have also been reports that the disconnect pin can become mislocated in the transfer rack due to a missing bumper.

Freeing A Jammed Indicating Tube - The following is an easy way to free the indicating tube after it has been jammed by over-adjusting:

1. Remove the screw that holds the left end of the transfer rack to the left hand indicator tube support ring.
2. Adjust indicating tube back to its correct position.
3. Install the transfer rack screw and adjust the transfer rack (front to rear).

Indicating Tube Disconnect - Indicating tube disconnect (dropping the tube) may be caused by an interference between the top guide lug on the transfer lever (Ref 31) and the sensing rack. A bind in this area could prevent the disconnect lever from engaging the transfer rack before the lock lever is restored to rest.

H. Print

Platen Damage - Pitting of the platen will result if punctuation marks are used when checking out the manual velocity control in the medium and high velocity positions. These pits can cause voids in a printed character.

Use of Protective Sprays - Protective spray which comes in contact with the font or platen may accumulate on same and cause impression problems.

Print Cam Follower Stud - Some machines may exhibit embossing in low velocity caused by excessive play in the print cam follower. One source of this motion may be the print cam follower stud (Ref 029). In some cases the treads were not cut far enough onto the stud and the nut may tighten on the threads instead of on the carrier.

If the stud seems loose even though the nut is tight, the stud may be replaced or a small washer may be installed under the nut.

Leadscrew Bias Rewind Linkage - With the new level rewind drive crank and old level long rewind link choke off could occur causing print problems.

High Temperature - Temperatures in excess of 94 can cause poor print quality.

"Hazing" or "Center Fill" of Closed Characters - Characters such as an "O" may show a "hazing" or "center fill" effect within the character, when the original master is examined. This "hazing" or "center fill" will not reproduce in most cases.

If "hazing" or "center fill" is noticeable on the REPRODUCED copy, corrective action involving refinement of the ink and fountain solution, change in exposure time or adjustment of the print mechanism on the Composer may prove effective.

Vertical or Horizontal Smear Problems

1. If loose rocker bearings are causing smear they can be tightened by inserting 4-40 set screws in the open un-threaded hole to the rear of the RH yoke Mtg screw. Tightening the set screw will cause it to cut its own threads and remove bearing looseness. The left hand rocker bearing may be tightened in a similar manner by removing the tape guide mounting screw (912 260) from the bottom of the rocker and placing a small piece of solder in the hole and then replacing the screw.
2. If the rocker shaft is loose in the right side of the carrier the following can be done:
    - (a) File off .60" from the tip of the rotate and tilt tape anchor screw (910-23).
    - (b) When the anchor screw is re-inserted in the carrier and tightened, the threads of the screw will be tightened against the rocker shaft removing any play.